

**WATER-BASED COATING COMPOSITION HAVING CARBAMATE –
MELAMINE CROSS-LINKING, METHOD OF PREPARING THE SAME, AND
A CURED FILM THEREOF**

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ABSTRACT

The present invention is directed to a curable, water-based coating composition utilized in waterborne coating systems. The coating composition is the reaction product of a water-based copolymer prepared by free-radical polymerization, and a cross-linking agent. The copolymer is the reaction product of a first block and a second block. The first block is the reaction product of a first ethylenically unsaturated monomer, acrylic acid, and a second ethylenically unsaturated monomer, methyl methacrylate, as well as the reaction product of a vinylaromatic hydrocarbon monomer, diphenylethylene. The second block is the reaction product of a plurality of ethylenically unsaturated monomers, styrene, 2-ethylhexyl methacrylate, cyclohexyl methacrylate, and carbonate-modified glycidyl methacrylate including a carbonate functional group that is subsequently converted into a carbamate functional group by ammonium hydroxide. The cross-linking agent, preferably a melamine, reacts with the carbamate functional group to establish a coating composition having urethane cross-linking from the carbamate – melamine reaction.